

UNIVERSITY OF
ILLINOIS LIBRARY
AT URBANA-CHAMPAIGN
BOOKSTACKS

CENTRAL CIRCULATION BOOKSTACKS

The person charging this material is responsible for its renewal or its return to the library from which it was borrowed on or before the **Latest Date** stamped below. **You may be charged a minimum fee of \$75.00 for each lost book.**

Theft, mutilation, and underlining of books are reasons for disciplinary action and may result in dismissal from the University.

TO RENEW CALL TELEPHONE CENTER, 333-8400

UNIVERSITY OF ILLINOIS LIBRARY AT URBANA-CHAMPAIGN

NOV 30 1990
NLU 4 990

When renewing by phone, write new due date below
previous due date. L162

Digitized by the Internet Archive
in 2011 with funding from
University of Illinois Urbana-Champaign

<http://www.archive.org/details/structureofproje121wats>

330
B335
02.121
Cop. A

CH-76

Faculty Working Papers

THE STRUCTURE OF PROJECT TEAMS
FACING DIFFERENTIATED ENVIRONMENTS:
AN EXPLORATORY STUDY IN
PUBLIC ACCOUNTING FIRMS

David J. H. Watson

#121

College of Commerce and Business Administration
University of Illinois at Urbana-Champaign



FACULTY WORKING PAPERS

College of Commerce and Business Administration

University of Illinois at Urbana-Champaign

July 26, 1973

**THE STRUCTURE OF PROJECT TEAMS
FACING DIFFERENTIATED ENVIRONMENTS:
AN EXPLORATORY STUDY IN
PUBLIC ACCOUNTING FIRMS**

David J. H. Watson

#121

THE STRUCTURE OF PROJECT TEAMS
FACING DIFFERENTIATED ENVIRONMENTS:
AN EXPLORATORY STUDY IN
PUBLIC ACCOUNTING FIRMS

David J. H. Watson
Assistant Professor of Accountancy
University of Illinois at Urbana-Champaign

Introduction

The fundamental importance and relevance of the behavioral sciences to accounting is exemplified by the number of recent behaviorally oriented accounting research studies.¹ A subset of these studies has been concerned with organizational and social psychological aspects of accounting firms.² In part this latter type of study has been an outgrowth of the concerns of a rapidly expanding public accounting profession and an increasing behavioral sophistication of academic accountants. These studies seem to have the potential for contributing to both the accounting profession and the behavioral sciences. The purpose of this present exploration is to make such a contribution with particular reference to understanding the organization of public accounting firms and within the behavioral sciences, to the theory of organization.

An Overview of the Study

This study is an exploration. The purpose of this (or any) exploration is to provide a basis for future investigations on the same subject, which in turn should lead to experimentation.³ Perhaps the present

¹For a summary of these recent articles see:
John W. Dickhaut, J. Leslie Livingstone and David J. H. Watson, "On the Use of Surrogates in Behavioral Experimentation," Accounting Review, XLVII, Supplement (1972), 455-71.

²As examples see:
James E. Sorensen, "Professionalism and Bureaucratic Organization in Public Accounting Firms," Accounting Review, XLII (July, 1967), 553-65.
Don T. DeCoster and John Grant Rhode, "The Accountant's Stereotype: Real or Imagined, Desired or Unwarranted," Accounting Review, XLVI (October, 1971), 651-64.

³Kenneth D. Mackenzie, "A Datum Are a System," in Research Methodology in Accounting, ed. by Robert R. Sterling (Lawrence, Kansas: Scholars Book Co., 1972).

study can best be described by linking the broad explanation of the research to the following synopsis of an experimenter's decision process, shown schematically below.⁴

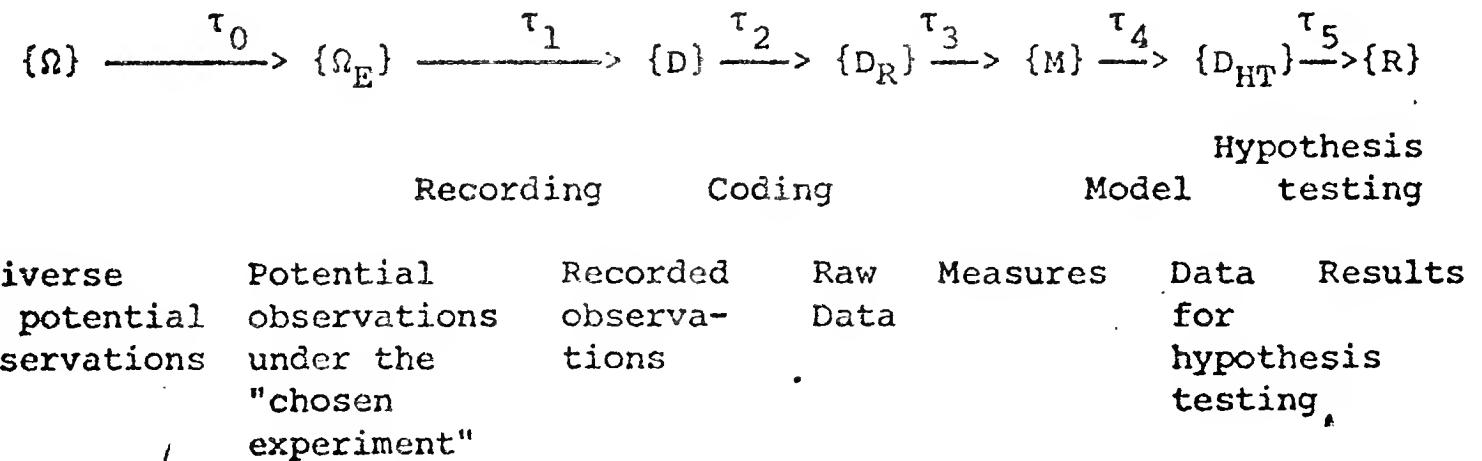


Fig. 1.--The states of data and transformation of the experimenter's decision process.

The research was undertaken to examine some environmental and structural aspects of organizations, in particular, public accounting firms. The universe of potential observations is not limited by the organization theory adopted to any particular organization or any particular organizational aspect. However, the "chosen experiment" consisted of public accounting firms (one in particular) because of the researcher's background and the availability of the public accounting firms as a research site.

The recorded observations were made on a subset of structural dimensions and environmental variables. The dimensions of structure chosen were some of those thought to be particularly relevant to small work groups, and the environment dimensions were restricted to those of the organization's task environment. The raw data were recorded as numbers, letters and

⁴ Kenneth D. Mackenzie and F. Hutton Barron, "Analysis of a Decision Making Investigation," Management Science, XVII (December, 1970), B-227.

patterns during semi-structured interviews. These were then converted into measures through the use of ordinal and ratio scaling. The results are discussed in terms of the hypotheses developed in the paper and the organization theory of other authors. Some limited statistical analysis is also employed to give the reader some idea of the strength of the suggested associations.

Relation to Previous Organizational Research

Burns and Stalker have suggested that organizations can be placed on a continuum, one end of which is defined as a mechanistic type of organization and the other end is defined as an organic (or organic) type.⁵ In general terms, Burns and Stalker, as well as other writers, contend that a mechanistic design is appropriate for organizations facing stable environments, but for organizations facing unstable environments (conditions of change) the appropriate structural form is an organic design.⁶ This contention was also the basis of the Lawrence and Lorsch research which demonstrated that the efficiency of a firm was related to the appropriateness (vis-a-vis environmental stability) of the firm's internal structure.⁷

The argument that internal structure is influenced by environmental conditions is not the only vigorous attempt at explaining organizational structure. Another line of research has examined the relationship between

⁵ Tom Burns and G. M. Stalker, The Management of Innovation (London: Tavistock Institute, 1961).

⁶ Ibid., pp. 5 and 6.

⁷ Paul R. Lawrence and Jay W. Lorsch, Organization and Environment (Homewood, Illinois: Richard D. Irwin, Inc., 1967).

organizational technology and organizational structure.⁸ However, the empirical support for establishing a relationship between organizational structure and organizational technology has not been overwhelming, leading at least one social scientist to suggest, "Research on the determinants of most dimensions of social structure in organizations should probably emphasize independent variables other than technological characteristics."⁹

In their research, Lawrence and Lorsch modified the above approach when they studied the relationship of the environment and organizational structure.¹⁰ While they recognized the technological variable, this was absorbed in the broader variable, environment. The research presented in this paper follows the Lawrence and Lorsch lead in examining the influence that subparts of the task environment faced by a public accounting firm have on some structural characteristics of the subsystems of that organization.

A Model of the CPA Firm

An organization can be modeled on a cycle consisting of three basic units, namely:

1. an input unit, leading to
2. a transformation process, leading to

⁸ Examples of this approach are:

Charles Perrow, "A Framework for the Comparative Analysis of Organizations," American Sociological Review, XXXII (April, 1967), 194-208.

David J. Hickson, D. S. Pugh, and Diana C. Pheysen, "Operations Technology and Organizational Structure: An Empirical Reappraisal," Administrative Science Quarterly, XIV (September, 1969), 378-97.

⁹ Lawrence B. Mohr, "Organizational Technology and Organizational Structure," Administrative Science Quarterly, XVI (December, 1971), 444-59.

¹⁰ Lawrence and Lorsch, op.cit.

3. an output unit.¹¹

Public accounting firms are professional, service oriented organizations and the following interpretation of the above cycle for this type of organization seems appropriate. The inputs may be thought of as unresolved client problems. An example of an auditing section's problem could be a client's set of unaudited financial statements. For the management services section an example is the problem of designing a new information system. The transformation process is the application of knowledge (technology or expertise) by the professional practitioner to the client's problems. The output thus becomes the solution set generated by the practitioner during the transformation process. To extend the above examples, the output for the auditing section may be a set of audited financial statements while for the management services section the solution set may be a set of possible information system designs. A diagrammatic presentation of the basic static model is as follows:

<u>Abstract Model</u>	input	transformation process	output
<u>Applied Model</u>	client problem	application of expertise to client problem by practitioner	solution to client problem

This model can be expanded to include a cycle for each of the functional areas typical of public accounting firms and could easily be thought of

¹¹Many closed and open systems theorists view the organization in this way. This is essentially what Thompson has proposed in his firm model (an open system subject to rationality norms) and what Katz and Kahn have proposed in their model (an energetic cycle). This simple basic system can obviously be made dynamic and more complex as needed.

James D. Thompson, Organizations in Action (New York: McGraw-Hill Book Company, 1967).

Daniel Katz and Robert L. Kahn, The Social Psychology of Organizations (New York: John Wiley and Sons, Inc., 1967).

as dynamic if the effects of any output on future inputs were considered or the cross functional area effects were incorporated. In this research the only expansion was to include the two functional areas of auditing services and management services.¹²

Environment of the Public Accounting Firm

Since only the auditing services and management services sections are examined in the research, only the subenvironments as they relate to these functional areas are discussed.

The Input Environment

The input (raw material) to the transformation process is a client problem. Generally, the auditing area subenvironment was expected to be relatively certain while the management service subenvironment was expected to be relatively uncertain.

Audit engagements in no way represent a completely standardized input. Different client organizations have different accounting systems. Accounting systems are either tailored to an organization or they evolve as the organization evolves. Consequently each accounting system has some idiosyncrasies representing the particular characteristics and information requirements of the organization. However, and this is important, all financial accounting systems have substantially the same constraints. Accounting systems are based upon the principles of double entry book-keeping and each system needs to produce financial information acceptable to the investing public, the public accounting profession, and govern-

¹²The basic reasons for this limited expansion were practical ones, namely, the need to limit the research task so that the research could be completed within a reasonable period; and the difficulty for the present in obtaining an acceptable operational definition of the project teams for the third major function of public accounting firms, the taxation services area.

mental agencies (for example, the Security and Exchange Commission and the Public Utilities Commissions). The auditor's challenge is to determine whether the financial information produced by the accounting system has been produced according to generally accepted accounting principles and the requirements of the law. Once the accounting system has been specified the problem facing the auditor becomes somewhat routine.

A second, and possibly the more important, point is that audit engagements are usually repeated. This means that the one accounting firm retains the audit of a corporation for several consecutive years. A major reason for this stability in the client-accounting firm relationship is the tremendous amount of learning required (of the client's accounting system, internal control procedures and general business) for the initial audit and consequently, the time and cost involved. Once the initial audit is completed subsequent audits should require minimal new learning, since most organizational changes are only marginal changes in existing activities.

Client problems in the management services area are not constrained in the above ways. Problems arise in the normal organizational activity and for various reasons management decides outside experts are needed to solve the problem. The problem received by the accounting firm is in a way a matter of chance. Each case is, in many respects, unique, in that the problem depends upon the particular client organization, the client's goals, economic conditions, task environment and a myriad of other details. In many cases the problem is poorly defined.

A second significant contrast is that problems are not likely to repeat themselves, especially within a client organization. In fact, it

seems a viable professional position that the more successful the public accounting firm is in solving a particular client's problem, the less likely the problem is to reappear for that client.

These general comments regarding management service engagements remain true even when the type of client problem is restricted to the design and installation of electronic data processing (EDP) systems. While the requirements still vary widely among clients and still depend upon the numerous variables suggested above, the restriction to the design and installation of EDP systems does limit the possible range of variation in management service problems. However, in this initial research effort, concentrating on the EDP system type of problem seemed rational, as over fifty per cent of the management service engagements in the accounting firm studied were concerned with the design and installation of EDP systems. Also, this area is probably one of the most rapidly expanding areas for public accounting firms. A similar cost-benefit rationale led to the exclusion of initial audit assignments from the empirical research. The great majority of audit assignments are second or subsequent year end audits for clients and so this audit problem type received the empirical research attention.

The Transformation Environment

The transformation process in public accounting involves the application of professional expertise, knowledge and available techniques by the practitioner to the client's problem. The totality of available techniques, knowledge and expertise is referred to as the technology of the industry (or society), or "the state of the art."

The state of the art of auditing does not seem to be expanding or changing as quickly as the state of the art in management services. Certainly there have been recently some important changes in the techniques of auditing, for example, the extensive use of statistically based sampling. Other important changes in auditing techniques have resulted from the growing number of electronic data processing systems. New methods have had to be developed for extracting the required audit information from the accounting records. However, these changes do not match the scientific boom in the EDP area with the resultant repercussions on system design and installation. Consequently, the auditing subenvironment was expected to be relatively certain while the management services subenvironment was expected to be relatively uncertain.

The Output Environment

The output of the transformation process should be a solution to the client's problem. In the case of auditing this is an audited set of financial statements with the accounting firm's opinion attached. For the management service area, the solution is a systems design or the design and installation of the system.

The auditor's prime responsibility is to ensure the opinion issue is based upon a professional performance during the transformation process. The auditor does need to meet certain legal and moral obligations but these are usually met if a professional performance is forthcoming during the audit.¹³ Also, in theory, a professional performance is all that

¹³ Recently, there has been an increasing number of law suits brought against the major public accounting firms particularly by client creditors and shareholders. This is provoking some serious debate within the accounting profession and is of some concern to accounting firms. As yet, considering the volume of opinions issued the suits have not been too serious.

needs concern the client. In practice, however, what is stated in the accounting firm's opinion may at times assume some importance for the client.¹⁴

A management service engagement presents slightly different constraints on the solution. The public accountant must again ensure a professional performance. However, he must also insure the client's needs are met and that the client is completely satisfied. With respect to the system the client has certain expectations regarding the output and usefulness of the system. These expectations, even though they probably change over a period of time, must be fulfilled. Whether the system design can be implemented, whether output does meet client expectations and is useful to the client can only be fully answered once the system has been installed and has been fully operational for a reasonable length of time. Consequently the auditing output environment was expected to be more certain than the management services output environment.

Project Teams--A Definition

The functional units of auditing and management services represent subdivisions of the organization developed for handling a differentiated task environment. However, they are not the basic operating units of the firm. The basic operating unit in the public accounting firm is the project team. This description is used to cover both an audit team--a team composed of auditing staff--and a management service team--a team

¹⁴This is especially true where qualifications are made by the accounting firm. The nature and strength of the qualifications are important to the client (because of legal and financial repercussions). However, any implications drawn from this interdependence regarding the audit would be highly political and speculative and are therefore not discussed in this paper.

composed of management service staff.

A project team can be defined as a small group of practitioners who are members of the accounting firm under investigation and who are working on a well defined assignment for the firm. This definition is sufficiently broad to cover all assignments the firm undertakes whether large or small and whether the project team had (or will have) a short or long life. As a practical matter, the project teams researched for this exploration were only those that existed for a reasonable length of time; that is, temporary systems were investigated but so they could be investigated an arbitrary period for their existence was defined.¹⁵

Project Teams and Environmental Uncertainty

The previous discussion has indicated there is circumstantial evidence suggesting a difference in the relative uncertainty in the various subenvironments facing public accounting firms. In particular the arguments suggest that the management services subenvironment reflects greater uncertainty than the audit environment. However, to this writer's knowledge so systematic evidence has been previously collected supporting such a view. Consequently the following statement is offered as the first general hypothesis of the study:

That the subenvironment faced by the management service project teams exhibits greater uncertainty than the subenvironment faced by audit project teams.

¹⁵The operational definition of "temporary" was related to chargeable hours. Chargeable hours is a standard measure used by accounting firms to define the size of a project. From discussions with some partners of the accounting firm researched, 1500 chargeable hours was accepted as the (approximate) minimum number of chargeable hours appropriate for defining "temporary". This figure was then used as a guide in selecting the projects and, therefore, the project teams.

Organizational Structure

Organizational structure has been the subject of a number of theoretical expositions and empirical studies. The literature cannot be sensibly reviewed here, but two important points will be noted. First, the concept of organizational structure is a multi-dimensional concept, and obviously an organization can vary along any dimension. Different researchers have used different dimensions in their studies and this makes any comparison among studies difficult. The absence of any widely accepted key dimensions creates difficulties in deciding which dimensions to examine. Second, the research must clearly identify what level of organizational generality is being examined, since what is an applicable dimension at one level of generality may not be applicable at another level.

The dimensions of structure actually chosen for study in the research were:

1. work flow patterns,
2. communication patterns,
3. choice (or work) relations in the team,
4. supervision patterns,
5. importance of formal rules, and
6. evaluation criteria of role occupants.

These dimensions leave out many attributes of structure typically studied in organizational research, for example, the span of control, the number of levels of authority (or levels to a shared supervisor), subordinate and superordinate ratios, functional specialization and others.¹⁶ These

¹⁶ For the use of other dimensions see as examples: Lawrence and Lorsch, op. cit. W. Evans, "Indices of Hierarchical Structure of Industrial Organ-

dimensions were not measured for two important reasons. First, some of these dimensions have been developed and used for research at a level of organizational generality greater than that studied in this research. Second, a number of these dimensions are related to the size of the group studied, and in public accounting firms the team size is related to three important factors; one, the normal or expected work in the assignment; two, the time available to complete the engagement; and three, the number of unexpected problems that arise. While some control could be exercised over the first variable, the other two variables could not be controlled.¹⁷

The three dimensions, supervisory patterns, importance of formal rules, and evaluation criteria for role occupants, are attributes of structure commonly studied in organizational research.¹⁸ These dimensions also appeared applicable to the research at hand, since each small problem solving group was composed of members from various echelons in the accounting firm and each higher echelon member supervises and evaluates lower echelon members. Also, all members are bound by general firm rules or guidelines.

izations," Management Sciences, 9 (1963), 468-77.

D. S. Pugh, et al., "Dimensions of Organization Structure," Administrative Science Quarterly, XIII (June, 1968), 65-105.

Richard H. Hall, "The Concept of Bureaucracy: An Empirical Assessment," American Journal of Sociology, LXIX (July, 1963), 32-40.

Stanley Udy, "'Bureaucracy' and 'Rationality' in Weber's Organization Theory: An Empirical Study," American Sociology Review, XXIV (December, 1959), 791-95.

¹⁷ In fact, to control for the problems that arise would mean controlling the environment variable (at least in part) which would defeat the purpose of the study.

¹⁸ As well as the references of footnote 16 see:

Richard H. Hall, "Professionalization and Bureaucratization," American Sociological Review, XXXIII (February, 1968), 92-104.

The study of group structure is one of the principal concerns of the discipline, group dynamics. While a number of approaches have been used, one approach concentrates directly on the relations between individuals.¹⁹ Individual members are the components of the group and the group structure is defined as the pattern of relations between each pair of members (interpersonal relations). The three dimensions of structure first specified in this section, choice (work) relations, work flow patterns, and communication patterns, can be classified as sociometric choices (the interpersonal relation A chooses B). These are the principal dimensions used in studying project team structure in this paper.

Organizational Structure--Hypothesis

Earlier in this paper a number of studies were mentioned which suggested that the formality of an organization's structure is related to the uncertainty in the task environment.²⁰ The present research simply applies this general notion to the basic working units in a public accounting firm. The following hypothesis is offered as the second major hypothesis of the study:

The greater the certainty of the relevant task environment the more formalized the structure of the project team.

¹⁹ For a summary of these approaches see:

D. Cartwright and A. Zander, eds., Group Dynamics: Research and Theory (Evanston, Illinois: Row Peterson, 1968).

²⁰

Burns and Stalker, op. cit.

Lawrence and Lorsch, op. cit.

"Formality" is used to suggest towards which end of the mechanistic-organismic continuum the teams are with respect to each structural dimension. A formal structure implies a mechanistic system design.

Environmental Uncertainty--Results

The method of measuring task environment uncertainty is based on the basic organizing methodology of accounting firms, the audit or work program. A number of items on the questionnaire constructed for the research concentrate on different aspects of these programs. The assumption made was that the programs reflect environmental conditions, or, more accurately, that differences in the audit and work programs reflect differences in environmental constraints. Relating this to the discussion of the input and transformation environments, the assumption involved is that programs cannot be clearly developed if client problems are not well defined and if the problem solution techniques are problematical. The thread of this argument is to be found in numerous theses in organization theory, particularly with respect to decision making and role specification.²²

²¹ One major public accounting firm was enlisted for this exploratory study. Three offices in different cities of this firm were contacted and each office supplied one audit team and one management service team. In each team three managerial personnel were interviewed (the partner, manager, and senior) except in one management service team where only the partner and manager were interviewed. The data were collected in two steps, first through the administration of a written questionnaire, and this was followed by an in-depth interview. The complete process required approximately three hours from each participant. For a full discussion of the research methodology, see David J. H. Watson, "The Structure of Project Teams Facing Differentiated Environments: A Study of Public Accounting Firms," an unpublished Ph.D. dissertation, The Ohio State University, Columbus, Ohio.

²² For a discussion of decision making, including clarity of the problem and solution techniques applicable, and the programmability of decision making see:

James G. March and Herbert A. Simon, Organizations (New York: John Wiley and Sons, Inc., 1958). See especially chapters six and seven.

James D. Thompson, Organizations in Action (New York: McGraw-Hill Book Company, 1967).

For a discussion of role specification and programmability see:

James G. March and Kenneth R. MacCrimmon, "Organizations," in Handbook of Social Psychology, ed. by Gardner Lindzey and Elliot Aronson (Reading, Massachusetts: Addison-Wesley Publishing Company, 1968), Volume 2, Chapter 8.

Questions from which the data were drawn concentrate on how well the programs are developed before the field work (design phase) is commenced.²³ The data show that audit programs are better developed than the work programs and that the audit programs have fewer problem areas in which no detailed solution procedure has been selected (Tables 1 and 2).²⁴ This indicates that the input and transformation subenvironments are less stable for management services than for auditing.

The question of uncertainty in the transformation environment was probed further. Management service personnel were of the opinion that many major technical changes took place in their field while auditing personnel generally considered few major technical changes occurred (Table 3).²⁵ The contrast between the two areas is exemplified by the following comments from two partners, one in each of the two functional areas. A management service partner stated, "I think the end, the solution of problems for clients, is extremely different today than a few years ago." On the other hand an audit partner suggested, "(that) much the change in the audit is not because of changes in the accounting profession but because clients have changed."

In the model being used to represent the CPA firm the output is the solution set generated during the transformation process. Uncertainty in

²³ In other words the data were collected at the beginning of Stage 3 (or end of Stage 2) as shown in Figure 6 of the appendix.

²⁴ Both questions showed significant differences between the areas. The significance levels for program development were .01 (t test) and .001 (Mann Whitney U test) and for the extent of the problem areas were .001 (t test) and .025 (Mann-Whitney U test).

²⁵ Again there was an indicated significant difference between the functional areas. The level of significance was at the .01 point and .001 point (both Mann Whitney U test) on the two variations of the question posed (Table 3).

TABLE 1
Audit and Work Program Development

Degree of development of the programs before commencement of the field work or design phase

<u>Team Averages</u>	<u>Audit</u>	<u>Management Services</u>
1	86.6	58.0
2	85.3	66.6
3	91.0	77.5
Average (all teams)	87.67	66.1

Scale: The higher the score the better developed the program was before commencement of the field work or design phase. Scale was from 0 to 100.

TABLE 2
Comparison of Problem Areas in Audit and Work Programs

Extent of the problem areas for which no solution procedure had been selected before the commencement of the field work or design phase

<u>Team Averages</u>	<u>Audit</u>	<u>Management Services</u>
1	11.7	31.7
2	13.4	50.00
3	22.34	42.00
Averages (all teams)	15.78	41.22

Scale: The higher the score the greater the extent of unsolved problems at the commencement of the field work or design phase. Scale was from 0 to 100.

Rank Order of Responses:

A A A M A A A M M A A M M M M M

A indicates auditing personnel

M indicates management service personnel

— indicates a tie in the rank order

TABLE 3
 Comparison of the Number of Major Technical Changes
 in Auditing and in EDP During a Five Year Span

(a) <u>Response Category</u>	<u>Auditing</u>	<u>Management Services</u>
none at all	0	0
a few major developments	6	0
many major developments	3	4
very many major developments	0	2
exceedingly many major developments	0	2
(b) <u>Response Category</u>	<u>Auditing</u>	<u>Management Services</u>
zero	0	0
1 or 2	6	0
3 or 4	2	1
5 or 6	1	5
7 or 8	0	0
9 or 10	0	1
more than 10	0	1

the output environment is linked directly to the acceptability of the solution set to the environment. Ultimately the solution's acceptability depends on whether or not future environmental demands find the solution adequate. Consequently, the output environment uncertainty was measured by asking the practitioners how confident they were that further information would not show their solution to be inadequate. Audit personnel were generally more confident in their solutions than management service personnel (Table 4).²⁶ The confidence expressed by management service personnel differed according to whether the question was asked at the completion of the design phase or at the completion of the installation phase (Table 4).²⁷ There was a significant reduction in uncertainty, for the management service personnel, during the installation phase. This is to be expected since installation of the system involves testing the practicality of subsystems in the system design. The feedback from this testing procedure should lead either to changes in design, if the subsystem fails, or to increased confidence in the system, if the subsystem operates successfully. The confidence the practitioners reveal reflects the degree of testing they have been able to perform on the solution set. Auditing personnel have a fairly good indication of the acceptability of their solution because the previous year's audit offers a good test run. Management service personnel exhibit more confidence when they both design and install a system rather than when they simply design the system since in the former case the design undergoes the rigors of implementation.

²⁶ The level of significance was .01 point (t test) and .025 point (Mann Whitney U test).

²⁷ There was a significant difference between the management service personnel responses at the completion of the respective phases. This significant level was at the .05 point (t test) and the .019 point (Mann Whitney U test).

TABLE 4
 Comparison Between Auditing and Management Service
 Personnel of Exhibited Confidence in Solution Set

The degree of confidence the practitioner has in his solution to the client's problem at the completion of the field work (for auditing) and at the completion of the design and installation phases (for management services)

<u>Team Averages</u>	<u>Auditing</u>	<u>Management Services</u>	
		<u>design phase</u>	<u>installation phase</u>
1	91.3	48.3	78.3
2	74.6	63.3	86.6
3	95.33	88.0	93.5
Average (all teams)	87.11	63.88	85.25

Scale: The higher the score the more confidence the practitioners have in their solution. Scale was from 0 to 100.

Rank Order of Responses:

M	M	M	M	A	A	M	M	A	A	A
M	M	M	S	M	M	M	S	S	S	S

A indicates audit personnel

M indicates management service personnel (at design phase)

S indicates management service personnel (at installation phase)

— indicates a tie in the rank order

Overall the environmental hypothesis was strongly supported for the input and transformation subenvironments and weakly supported in the output subenvironment. Because of the overall strong support for the first hypothesis support for the second research hypothesis (on organizational structure) was predicted.

Organizational Structure--Results

Small group dimensions:

The work relations specified by the respondents are shown in Figure 2. One immediately obvious difference in team structure lies in the number of client personnel chosen as co-workers by the respective team members. Management service personnel tended to choose more client personnel as their co-workers than did members of the audit teams. This reflects to some extent the differing nature of the client problem. Management service personnel when they finish leave behind a system to be operated by client personnel, whereas the auditors are in part evaluating the work of the client personnel.²⁸

The complete interaction pattern above probably also reflects the type of significant problems that arose during the assignment (transformation process) and the communication patterns used in solving these problems. The audit teams encountered more technical problems than the management service teams while the latter had more client associated problems (Table 5). Technical problems, in both functional areas, tended to be solved within the accounting firm and principally within the project team. Client associated problems, however, involved a good deal more inter-

²⁸ The differences, in the proportions of client and firm personnel chosen by the respective functional area teams, was not statistically significant at the .05 point.

KEY 1

The following relationships hold in the graphs
in Figures 2 and 3.

$X \xrightarrow{\hspace{1cm}}$ Y implies X chose Y.

$X \longleftrightarrow Y$ implies X chose Y and Y chose X.

P stands for Partner.

M stands for Manager.

S stands for Senior.

a stands for staffman or junior.

C stands for Client employee.

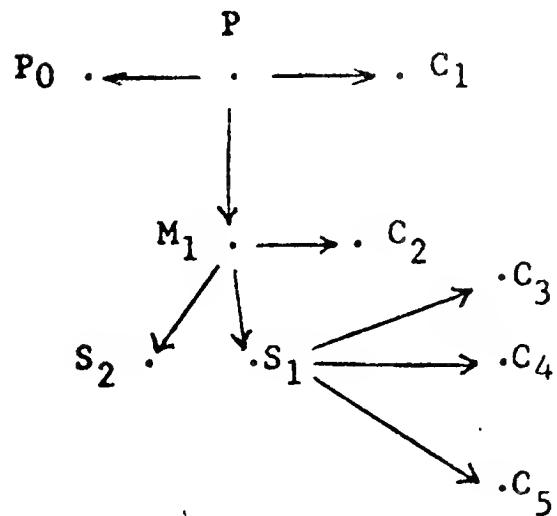
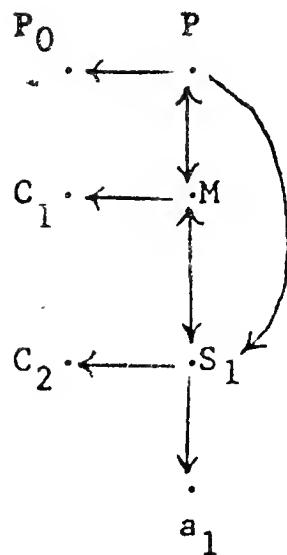
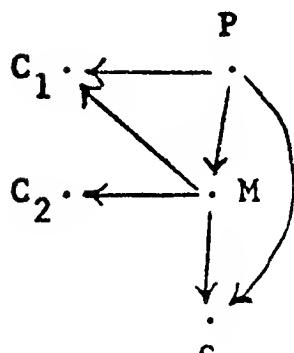
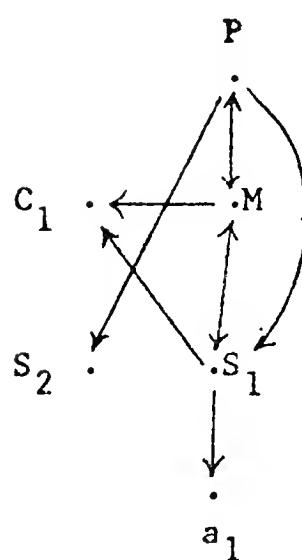
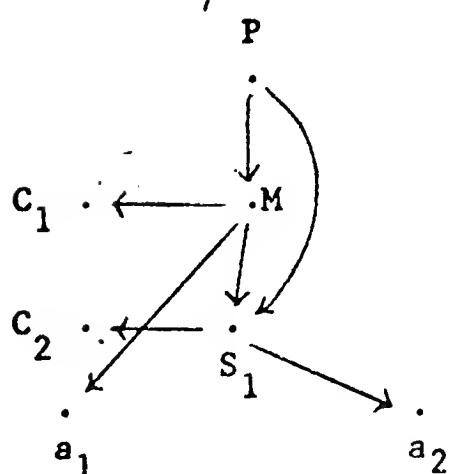
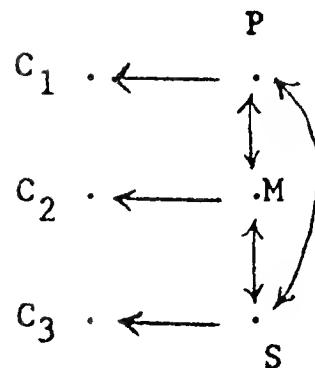
Management Service TeamsAudit Teams

Fig. 2--Indicated choices by Partners, Managers and Seniors of the individuals with whom they worked the closest.

TABLE 5
Comparison of Management Service
and Audit Problem Areas

Extent of problem areas encountered during the project.

	<u>Technical Problems</u>		<u>Client Associated Problems</u>		<u>A</u>	<u>M</u>
	<u>A</u>	<u>M</u>	<u>A</u>	<u>M</u>		
a. no significant problems	2	4	a. no significant problems		7	0
b. a few significant problems	7	1	b. a few significant problems		2	7
c. many significant problems	0	2	c. many significant problems		0	0

A indicates audit personnel.

M indicates management service personnel.

Summary of Communication Choices

The communication choices by team members in solving problems encountered on the project.

	Technical Problems		Client Associated Problems		<u>A</u>	<u>M</u>
	Choices inside firm	Choices outside firm	Choices inside firm	Choices outside firm		
Audit team choices	11	5	8	5		
Management service team choices	13	2	8	7		

action between the project teams' members and client personnel (Table 5).²⁹

When comparing the responses noted in Figure 2 at the individual level (rather than the aggregate group level as above) a major difference in the structure of the working relations of the team in each functional area can be discerned (Figure 3). Managers in audit teams always chose the partner and the senior (a strict hierarchical choice) as two of the three people with whom they worked closest on the assignment. However, the management service managers never chose the partner as one of the three individuals with whom they worked closest on the assignment. The management service partner was considered an isolate in the close working relations of the group.³⁰

This indicated communication breakdown finds support in a more detailed analysis of the responses to two questions on the environmental uncertainty faced by the project teams. The first question inquired as to the extent of unsolved problem areas before the field work (auditing) and design phase (management services) was commenced (Table 6). In each management service team the partner thought there were fewer problem areas than the manager, and this difference in opinion was, in every case, quite substantial.³¹ In contrast the partners and managers of the audit

²⁹ This difference in communication choices by the teams in each functional area because of the difference in the type of problem was significant for the management service teams (at the .05 point--Chi-Square test) but not significant for the auditing teams.

³⁰ Fisher's Exact Probability test was run on the managers' choices in the respective functional areas and this showed the difference to be significant at the .05 point.

³¹ The difference was significant at the .05 point (Mann Whitney U test).

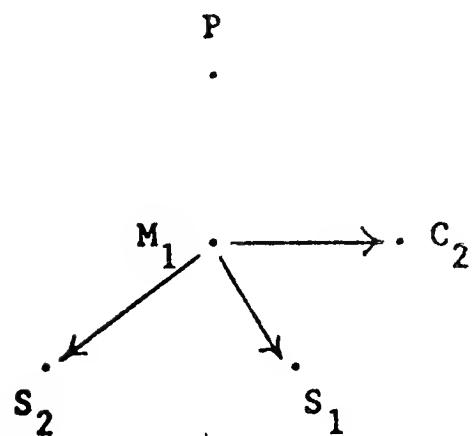
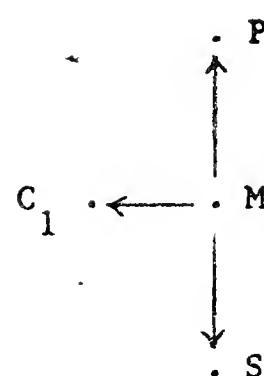
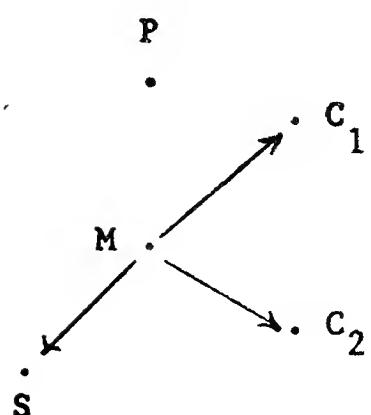
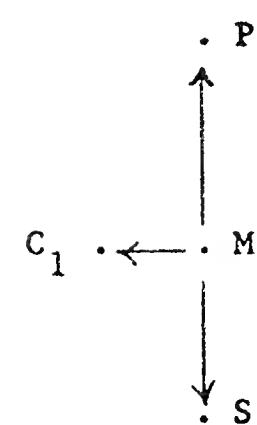
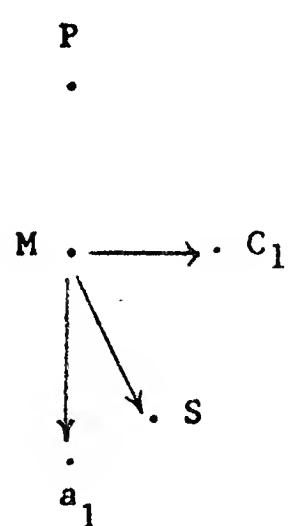
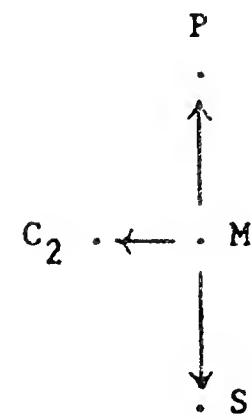
Management Service TeamsAudit Teams

Fig. 3--Indicated choices by Managers only of the individuals with whom they worked the closest.

TABLE 6
 Comparison of Partners' and Managers' Responses
 on the Extent of the Problem Areas

<u>Management Service Teams</u>		<u>Audit Teams</u>	
<u>Partners</u>	<u>Managers</u>	<u>Partners</u>	<u>Managers</u>
10	55	10	20
50	80	20	10
20	64	20	27
Average	27	17	19

Scale: The higher the score the greater the extent of the problem areas. Scale was from 0 to 100.

teams were in substantial agreement. The second question asked how important these unresolved problem areas were for the successful completion of the projects (Table 7). In each management service team the unresolved problems were thought to be more important by the manager than by the partner.³² The reverse was true for the audit teams. However, again the salient feature of the data is the relatively close agreement between the auditing partners and managers compared to the relatively substantial disagreement between the management service partners and managers.

The third small group measure of structure was based upon the work flow patterns of the project teams, principally the delegation of work by the team members. Many indices exist for the measurement of group structure, but perhaps the indices most rigorously developed are those in the theory of directed graphs.³³ The two related structural indices used here are based upon the distance matrix of a digraph. The first index, relative centrality, was used by Bavelas in research on communication networks.³⁴ The second measure, relative status, was developed by Harary quite independently of the Bavelas measure (although one is the reciprocal

³² The difference was not significant at the .05 point (Mann Whitney U test). The actual probability (significance point) was .200.

³³ For a summary of the numerous techniques available see: Murray Glanzer and Robert Glasser, "Techniques for the Study of Group Structure: I Analysis of Structure," Psychological Bulletin, 56 (September, 1959), 317-22. The structural analysis of this section of the paper is based upon: Frank Harary, Robert Z. Norman, and Dorwin Cartwright, Structural Models: An Introduction to the Theory of Directed Graphs (New York: John Wiley and Sons, Inc., 1965).

³⁴ Alex Bavelas, "Communication Patterns in Task-Oriented Groups," in Group Dynamics: Research and Theory, ed. by D. Cartwright and A. Zander (Evanston, Illinois: Row Peterson, 1968), Chapter 37.

TABLE 7
 Comparison of Partners' and Managers' Responses
 on the Importance of the Problem Areas

Management Service Teams		Audit Teams	
Partners	Managers	Partners	Managers
00	64	40	30
80	90	80	80
30	55	60	55
Average	36	69	60
			55

Scale: The higher the score the greater the importance attached to the problem areas. Scale was from 0 to 100.

of the other) and is particularly useful in analyzing delegated authority in an organization.³⁵

The results are shown in Table 8. The first point to note is the hierarchical nature of the relative status (relative centrality) measure. In each functional area the partners tend to have the highest relative status (lowest relative centrality), managers are in the middle, and seniors have the lowest relative status (highest relative centrality). This reflects the firm organizational pattern and the fact that team members are drawn from the various organizational echelons with each echelon having prescribed functions and positional authority. Interestingly, however, audit partners tend to have a higher relative centrality than management service partners while the reverse is true at the manager level.³⁶ This seems to indicate that management service partners delegate more to their managers than to audit partners. This interpretation is consistent with the previous observations where the management service partner was considered an isolate (insofar as close working relations were concerned) by the management service ^{managers} partners.

These results are also consistent with previous research. For example, the Lawrence and Lorsch research suggests that in organizations facing relatively uncertain environments the locus of decision making should be at lower echelons of the organization since the information necessary to make these decisions exists only at these lower levels.³⁷ During the

³⁵ Frank Harary, "Status and Contrastatus," Sociometry, 22, 1 (1959), 23-43. Also see Harary, Norman and Cartwright, *op. cit.*, 189.

³⁶ The difference between the partners was significant at the .100 point while the difference at the manager level was significant at the .057 point (when the promoted senior was included) and at the .100 point (when considering only the managers in charge of the job). All were Mann Whitney U tests.

³⁷ Lawrence and Lorsch, *op. cit.*

TABLE 8
 Comparison of the Audit and Management Service Teams'
 Relative Status and Relative Centrality

<u>Partners</u>		<u>Relative Status Measures</u>				<u>Seniors</u>	
		<u>M</u>	<u>A</u>	<u>Managers</u>		<u>M</u>	<u>A</u>
.667	.537	.333	.428			.138	.180
.59	.435	.272	.391			.233*	.174
.50	.392	.267	.315				.148

<u>Partners</u>		<u>Relative Centrality Measures</u>				<u>Seniors</u>	
		<u>M</u>	<u>A</u>	<u>Managers</u>		<u>M</u>	<u>A</u>
1.497	1.862	3.003	2.336			4.292*	5.556
1.695	2.299	3.676	2.558			7.246	5.747
2.000	2.551	3.745	3.175				6.757

*This senior was promoted to manager during the assignment.

M stands for management services
 A stands for auditing

interviews conducted as part of the present research this was precisely the reason given for the apparent break in the working relationship between the management services partn rs and managers. Consequently it is felt that the second hypothesis, at least so far as the small group dimensions are concerned, is strongly supported.

Organizational dimensions:

As indicated previously, three common organizational dimensions were also investigated during the research. In part these dimensions represent a slightly different level of organizational generality than the three small group dimensions. However, because of previous research, and the strong support for the environmental hypothesis, the following seemed to be reasonable expectations:

1. the audit team members would experience greater (in extent, frequency, and rigidity of format) supervision than management service team members,
2. more importance would be placed on organizational rules in the auditing area than in the management service area, and
3. the evaluation criteria emphasized would be different in each area, in particular, they would be "mechanistic" in the audit area and "organismic" in the management service area.

The expectations were only partially fulfilled.

Three aspects of supervisory style were examined: the extent of supervision by superordinates of subordinates, the frequency of such supervision, and the format of the supervision. Although the data imply

that the extent and frequency of supervision are greater in the auditing area than in the management services area (as predicted) the differences were very small (Figures 4 and 5).³⁸ As far as the format of supervision is concerned there was no difference between the functional areas in this aspect at all.³⁹

A number of practitioners thought the most interesting questions during the interviews were those concerning organizational rules. One question asked to what extent organizational rules affected the design of the program. Two situations were posed, one in which the respondent was free to design his own program and the other was his present situation as a member of the firm. The practitioner had to decide how much the situations affected program design. It was assumed that the greater the number of differences in the program design the more organizational rules affected the task. The results indicate that rules were considered to be more restrictive in the auditing area than in the management service area (Table 9).⁴⁰ From the discussion of this question it became apparent that the practitioners understood the full intent of the question and for this reason some substance can be placed in the general direction of the answer.

Another question was asked concerning the importance of organizational rules on program design. This required a ranking, according to their effect on program design, of the four variables, organization rules, professional

³⁸ The differences were not statistically significant.

³⁹ The format of supervision used was "a review of the working papers followed by an oral discussion."

⁴⁰ The observed differences just failed to be significant at the .05 point.

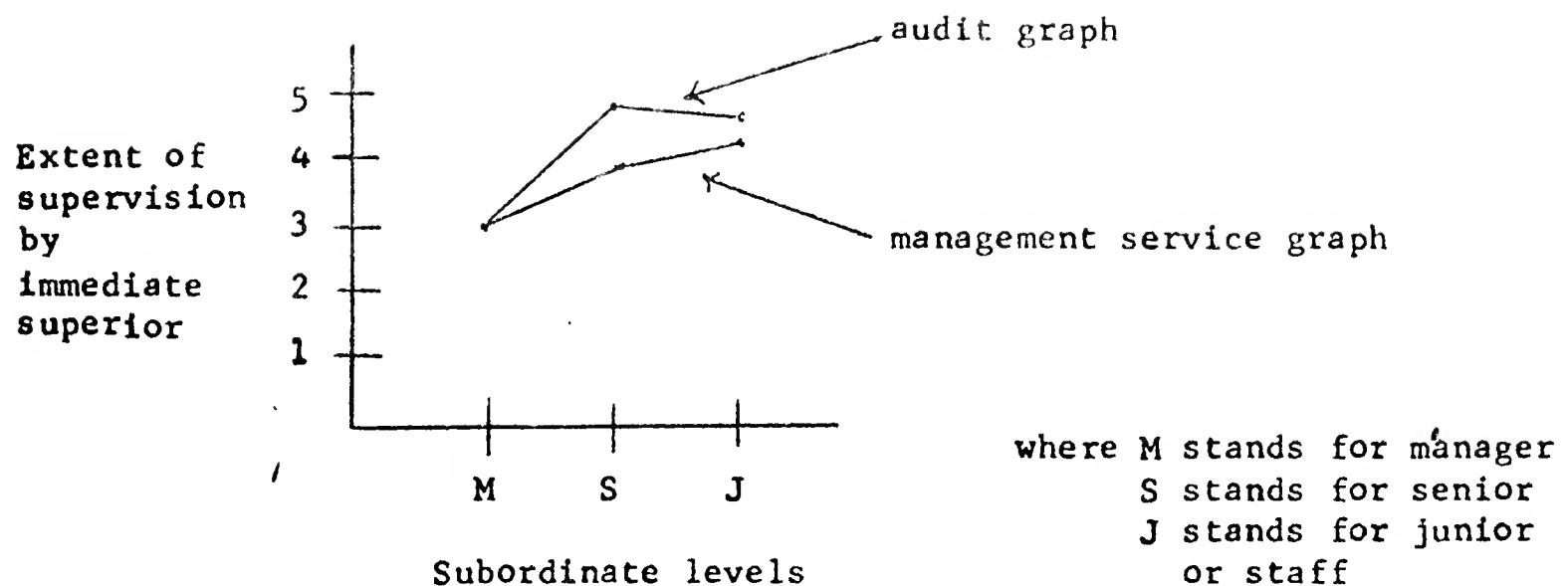


Fig. 4--A comparison of the extent of supervision in the two functional areas.

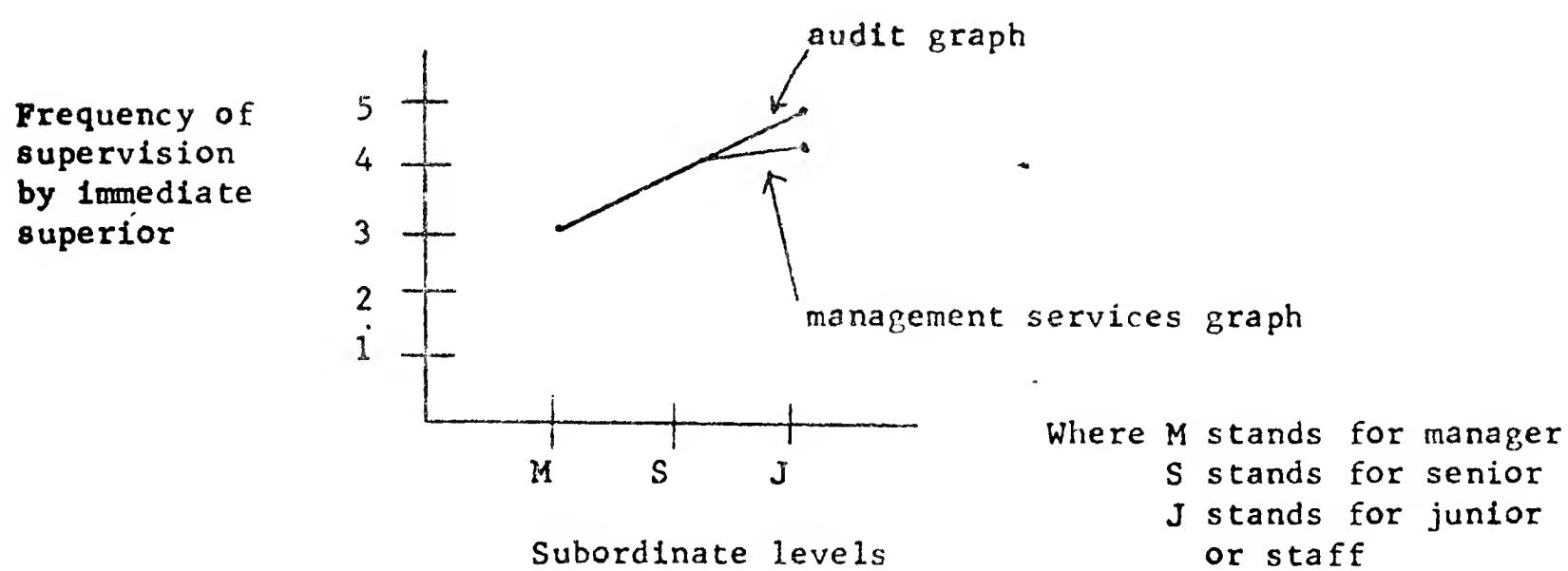


Fig. 5--A comparison of the frequency of supervision in the two functional areas.

TABLE 9
Comparison of Professional Freedom on Program Design

(a) Indicated differences in program design because of organizational rules.

<u>Response Category</u>	<u>Auditing</u>	<u>Management Services</u>
exactly the same design	3	6
similar--a few differences in design	5	2
a substantial number of differences in design	1	0
a great many differences in design	0	0
a completely different design	0	0

(b) Importance of rules in program design compared to professional judgment, AICPA standards and professional code of ethics.

<u>Assigned Rank of "Organizational Rules"</u>	<u>Audit Team Responses</u>	<u>Management Service Team Responses</u>
1	1	5
2	6	3
3	2	0
4	0	0

judgment, AICPA standards, and the professional code of ethics. The data from this question suggest that organizational rules were emphasized more in management services than in auditing, as organizational rules tended to be ranked first in the management services area and second in the audit area.⁴¹

Unfortunately this question had a few limitations the importance of which were only fully realized during the interview.⁴² Therefore in evaluating the significance of the results of each question, for the moment, greater reliance is placed on the results of the first question. Naturally, the results of the second question cannot be ignored in any future replication but some restructuring of the question seems applicable.

Given two systems, each characterized as intensive technology systems, one facing a relatively stable environment and the other a relatively unstable environment, what kind of evaluative criteria should be employed in each system? A reasonable theoretical suggestion is that each should

⁴¹ The result was statistically significant at the .025 point (Mann Whitney U test).

⁴² First, the firm's booklet on EDP practice had been issued only since 1969. There was a continuing drive to convince firm members to follow the general guidelines of the booklet, especially members with limited EDP background and this "sales" pressure may have made these guidelines (one may interpret these as rules) prominent in the minds of the management service personnel. Second, in both functional areas AICPA standards and the professional code of ethics were usually ranked third and fourth since these were considered less demanding than the firm's policies. Consequently the choice was essentially between "professional judgment" and "organizational rules". The professional image of public accounting firms stems traditionally from the auditing function. Since part of the professional image concerns professional judgment a question which essentially compares "rules" to "professional judgment" as a work method, could be touching on a sensitive issue for auditors.

include criteria measuring adaptability (to reflect the intensive technology) but that the system facing the relatively unstable environment would place greater emphasis on adaptability criteria. This is the position reflected by the data collected on the final organizational dimension researched, the evaluation criteria used by the firm (Table 10). The responses by the practitioners indicated that in both functional areas adaptive behavior was emphasized, although such behavior was emphasized to a greater extent in the management services area.⁴³

The data on these three organizational dimensions do not provide significant support for the second hypothesis even though there is some indication that differences, in the expected direction, exist between the functional areas. There are a number of possible reasons for this lack of support. Most of these could be classed as methodological.⁴⁴ The answer to this class of reasons lies primarily in future replications using the same or slightly different methodologies. However, a more interesting possibility is that the expectations, based on previous research, are inappropriate. Since these organizational dimensions were used previously to distinguish between the structure of similar functions in different organizations they may not be appropriate dimensions on which to distinguish between the structures of different subsystems within the same organization. The answer here has to lie in changing

⁴³ The difference between the functional areas on the emphasis on adaptive behavior ^{was} not statistically significant.

⁴⁴ For example one reason could be that the research questionnaire was not sensitive to the differences that actually exist. Another reason could be that while the measurement instrument (questionnaire) would monitor actual differences if they existed the sample was inappropriate.

TABLE 10
Observations on the Firm's Evaluation Form

		Audit Area	Management Service Area
Organismic	Positive Emphasis	28	27
	Negative Emphasis	13	6
Mechanistic	Positive Emphasis	6	3
	Negative Emphasis	11	1

the question being pondered. This calls for some refinement in the theory which will not be pursued at this time.

Conclusion

There are only a handful of studies that have examined the public accounting firm from an organizational standpoint.⁴⁵ The objective of this final section is to relate the present study to one of these previous studies, namely, the original study made by Sorensen.⁴⁶ He initially suggested a relationship between bureaucratic and professional orientations and the job satisfaction and migration plans of certified public accountants (CPA's). Sorensen further suggested that the new college graduate choosing a CPA firm career possesses "a high but unrealistic professional orientation and a low but unrealistic bureaucratic orientation on entering the firm."⁴⁷ This problem, of unreal (inaccurate) expectations on the part of new entrants to the profession, is the focus of continuing studies by Sorensen.⁴⁸ The current importance attached to this line of research

⁴⁵ James E. Sorensen, "Professional and Bureaucratic Organization in the Public Accounting Firm," Accounting Review, XLII (July, 1967), 553-65.

Paul D. Montagna, "Professionalization and Bureaucratization in Large Professional Organizations," American Journal of Sociology, LXXIV (September, 1968), 138-45.

Another study on a similar topic and including public accounting firms can be found in:

Richard H. Hall, "Professionalism and Bureaucratization," American Sociological Review, XXXIII (February, 1968), 92-104.

and "Some Organizational Considerations in the Professional-Organizational Relationship," Administrative Science Quarterly, XII (December, 1967), 461-78.

⁴⁶ Sorensen, *op. cit.*

⁴⁷ Ibid., 565.

⁴⁸ See for example: James E. Sorensen and Thomas L. Sorensen, "Comparison of 1965 and 1970 Organizational and Professional Profiles and Migration Plans of Large-Firm CPA's," in Behavioral Experiments in Accounting, ed. by Thomas J. Burns, College of Administrative Science, The Ohio State University, Columbus, Ohio, 1972.

provides the impetus for analyzing the original Sorensen questions.⁴⁹

Sorensen makes three observations which can be refined by the present study.⁵⁰ Briefly, these are:

1. there is a conflict between bureaucratism and professionalism in large CPA firms,
2. job satisfaction is affected by bureaucratic orientation,
3. migration is affected by the task of managing a hybrid professional-bureaucratic orientation.

The suggested refinements in the above observations stem principally from the observed differences in the two functional areas studied in the present research.

With respect to the first observation above, there is now reason to suspect the conflict between the two orientations in large CPA firms is not constant among functional areas of the firm. The present study has noted the mechanistic organization of the auditing function. As such, it is not surprising to find conflict between the bureaucratic and professional orientations in this functional area. However, in the management service function an organicistic organization was noted. It is suggested that an organicistic orientation is fairly compatible with the professional orientation, thus reducing the conflict between professional and bureaucratic orientation in the management service area.⁵¹

⁴⁹ For information indicating continuing interest see: Park E. Leathers, "Staff Retention in Public Accounting Firms," Journal of Accountancy, 131, 1 (January, 1971), 87-90.

⁵⁰ One may suggest that there are some logical and empirical questions regarding the validity of the comparisons. However, the comments of this section are intended to be speculative and provocative in nature, and to be the subject of future verification or falsification.

⁵¹ This comparison is valid only to the extent that the mechanistic and bureaucratic theories of organization are similar and to the extent that the organicistic and professional theories of organization are similar.

The second and third observations are concerned with job satisfaction and migration habits. If the first refinement above proves correct, then some difference in job satisfaction and migration habits should be expected between the functional areas. Specifically, job satisfaction should be higher while migration should be lower. This is reinforced by the present study. Both managers and seniors in the management service function had greater relative centrality than their counterparts in auditing. If, as is suggested in the literature, relative centrality is related to an individual's morale (the greater the relative centrality, the higher the morale) this would be another reason for expecting a difference between the two functional areas.⁵²

These comments are not meant to invalidate Sorensen's past study. Rather, these comments suggest there is some structural variation within any firm that should be of major concern in a complete analysis and that the mechanistic-organismic dichotomy offers one viable paradigm for investigating these differences.

⁵² See Alex Bavelas, "Communication Patterns in Task-Oriented Groups," in Group Dynamics: Research and Theory, ed. by D. Cartwright and A. Zanders (Evanston, Illinois: Row Peterson, 1968), Chapter 37. The assumption implicit here is that morale is related directly to job satisfaction and inversely to migration.

APPENDIX

A Description of the Work Methodology Of Public Accounting Firms

The basic instrument used in a public accounting firm to guide and control the firm's personnel in determining a solution to a client problem is called a program, commonly termed an audit program in the functional area of auditing and a work program in the functional area of management services. Audit programs have been used by public accounting firms in their conduct of audit engagements for some time, and undoubtedly the success of the program approach here led to its adoption in the management services area. What follows is a description of the general approach used in conducting an audit or a management service assignment.⁵³

The first step in an assignment is a "quick" review of the client's situation. In an audit the review consists primarily of evaluating the client's accounting procedures and his system of internal control. The management services review consists of reviewing the client's present procedures and defining the problem and the objectives of the project. Essentially, the review involves gathering sufficient detail to enable the development of the program. The program then

53

The chronological phases of audit and management service assignments with a suggested equivalence of the phases is diagrammed on the following page.

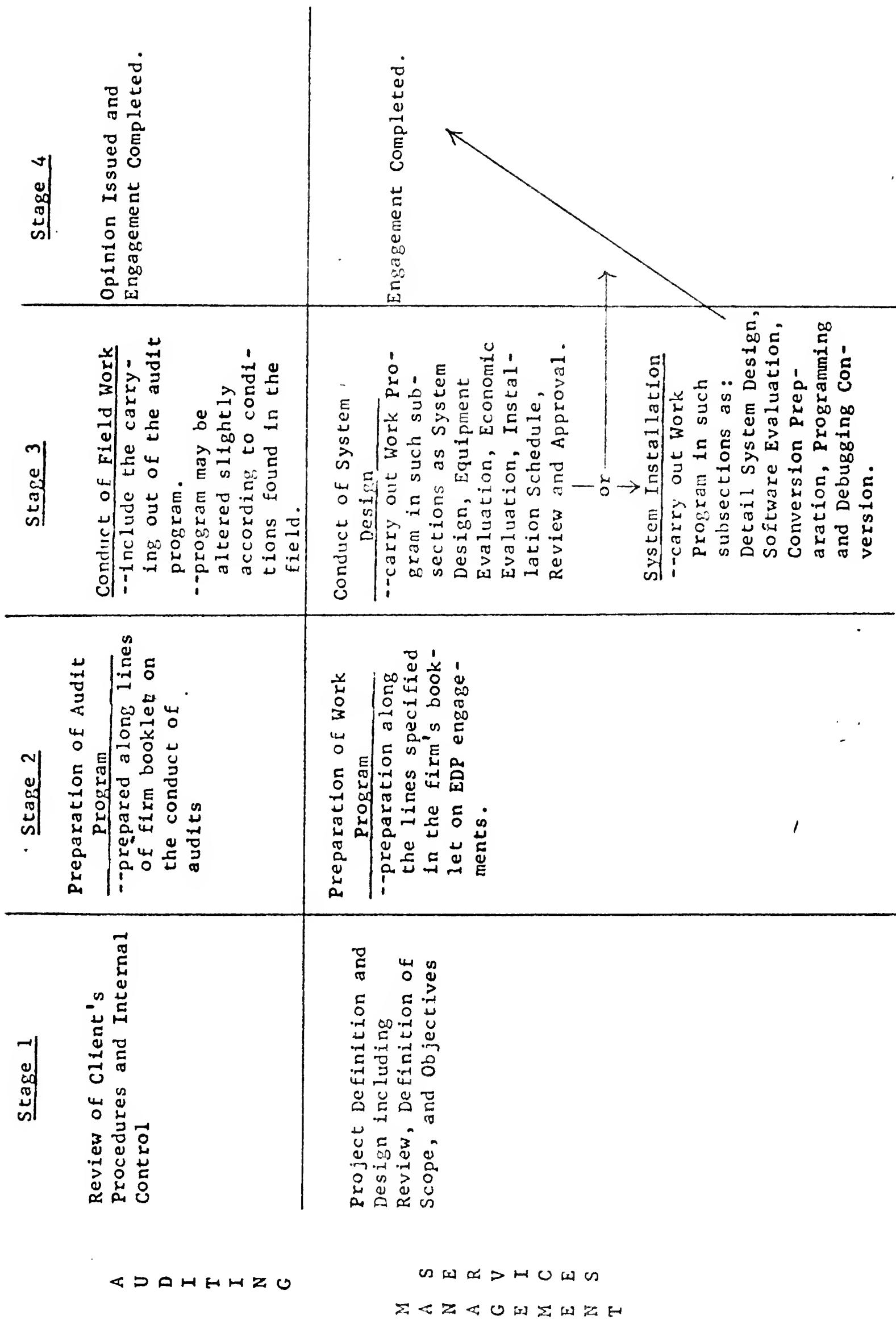


Fig. 6--Chronologically equivalent stages of auditing and management services engagements.

defines the scope of the work contemplated and the manner in which the engagement is conducted.

After the program development, the next step is to carry out the specifications in the program. This phase is called the field work in the auditing function. The field work involves working through the audit procedures (subprograms) specified in the audit program. At times these procedures may be altered slightly because actual conditions encountered in the field differ from those conditions expected. This reflects some uncertainty or instability in the input environment. Once the field work is completed, the auditor issues an opinion on the fairness and conformity with generally accepted accounting principles of the client's financial representations. This completes the audit engagement.

The third step of management service assignment relates to the system design and installation. The system design phase includes designing the system, developing an installation schedule, evaluating the electronic equipment available, and performing an economic evaluation of the proposed system. At this time, the assignment could be terminated by the client.⁵⁴ If, however, the engagement isn't terminated, the installation proceeds. This will include detail

⁵⁴ A few obvious reasons for termination at this stage are:
(a) the client decides on the basis of the economic evaluation not to proceed,
(b) the system cannot meet management's technical expectations,
(c) the client just decides to wait, and
(d) the client decides to install a "package system" from one of the computer firms.

system designing suitable for programing (and debugging), designing of forms, conversion preparation and conversion, and the evaluation or development and modification of software. Once the system is operating and the conversion complete, the engagement is completed.



UNIVERSITY OF ILLINOIS-URBANA



3 0112 046516206